UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,979	11/26/2003	David B. Gilgen	RSW9-2003-0248US1 (7161-1	9498

46320 7590 03/09/2007		EXAMINER
CAREY, RODRIGUEZ, GREENBERG & PAUL, LLP STEVEN M. GREENBERG 950 PENINSULA CORPORATE CIRCLE SUITE 3020 BOCA RATON, FL 33487		DENG, ANNA CHEN

ART UNIT	PAPER NUMBER
2191	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	10/723,979	GILGEN ET AL.
	Examiner	Art Unit	
	Anna Deng	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _26 November 2003_.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-20_ is/are pending in the application.
  4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) _1-20_ is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on _26 November 2003_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a) ☐ All   b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____.
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
  Paper No(s)/Mail Date _11/26/2003_.
4) ☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   This action is in response to application filed on 11/26/2003.

2.   Claims 1-20 are pending and have been examined.

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4.   Claims 7-9 are rejected under 35 U.S.C. 101 as the claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring article/phenomenon) since it fails to produce a useful, concrete and tangible result.

Claims 7-9 set forth a memory leak detection and reporting system that is computer program claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F. 3d at 1583-84, 32 USPQ2d at 1035 (see 1300 OG 142142 (November 22, 2005) (in particular, see Annex IV (a)). (see MPEP 2106.01 "Computer-Related Nonstatutory Subject Matter") (in particular, see "I. FUNCTIONAL DESCRIPTIVE MATERIAL: "DATA STRUCTURES " REPRESENTING DESCRIPTIVE MATERIAL PER SE OR COMPUTER PROGRAMS REPRESENTING COMPUTER LISTINGS PER SE").

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 1-3, 5-17, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Dahlstedt et al. US 2004/0133895 A1 (hereinafter Dahlstedt), in view of Tarditi US 6,625,808 B1

(hereinafter Tarditi).

Per Claim 1:

        Dahlstedt teaches A memory leak detection and reporting method (Dahlstedt, [0007], "The

invention provides a system and method for detecting memory leaks") comprising the steps of: time

stamping allocated ones of resources in a resource pool (Dahlstedt, [0009], "a memory space for storing

objects , ... stamping each object with a time stamp when created"); detecting memory leaks by

inspecting individual timestamps for said allocated resources to determine whether said allocated

resources have become overly idle (Dahlstedt, [0007] "the invention provides a mechanism by with

objects in the memory space of a virtual machine are analyzed as to whether they are "warm" or "cold",

i.e., how long they have been persisted in memory without being accessed or referenced by another

object") ; and, for each allocated resource determined to have become overly idle, reporting an identity of

a corresponding one of said calling code segments (Dahlstedt, [0008], "the invention comprises a system

for determining potential memory leaks in a run-time environment, ...an object temperature analyzer that

determines the status of warm objects and cold objects in said memory, and the links between said warm

and cold objects, and, a report mechanism that reports information about said links, for use in determining

potential memory leaks", also see, FIG. 3, [0021], Dahlstedt teaches cold objects as determined to have

become overly idle, "The time stamp for each object is checked against the current system time, and

those objects that have a time stamp older than a particular period of time are marked as cold objects").

Dahlstedt does not explicitly teach identifying calling code segments receiving said allocated resources.

However, Tarditi teaches identifying calling code segments receiving said allocated resources (Tarditi,

FIG. 4, call stack 402 or 406, col. 11, lines 10-49, "a live object is an object which has an identifiable

pointer in the root set, e.g., call stack 402 or 406... for each transition from a GC frame to a non-GC

frame in the call stack 402, creation function 304 allocates space on the stack frame for a transition

record, e.g., transition records 420 and 424. The transition store select pointer and state information, as

well as a pointer to the immediate past transition record, e.g., transition record 424.").

It would have been obvious to one having ordinary skill in the computer art at the time of the

invention was made to modify the method disclosed by Dahlstedt to include identifying calling code

segments receiving said allocated resources using the teaching of Tarditi. The modification would be

obvious because one of ordinary skill in the art would be motivated to facilitate automated memory

management among heterogeneous components of a computer program (Tarditi, col. 4, lines 40-42).

Per Claim 2:

Dahlstedt teaches a memory leak detection and reporting method (Dahlstedt, [0007]), Dahlstedt

does not explicitly teach the step of retrieving identities for individual ones of said calling code segments

from an associated calling stack when said individual ones of said calling code segments acquire one of

said allocated resources. However, Tarditi teaches the step of retrieving identities for individual ones of

said calling code segments from an associated calling stack when said individual ones of said calling

code segments acquire one of said allocated resources (Tarditi, FIG. 6, step 606, col. 12, lines 58-63).

Per Claim 3:

Dahlstedt teaches a memory leak detection and reporting method (Dahlstedt, [0007]), Dahlstedt

does not explicitly teach the step of performing said detecting and reporting steps in a separate thread of

execution. However, Tarditi teaches the step of performing said detecting and reporting steps in a

separate thread of execution (Tarditi, col. 11, lines 2-7).

Per Claim 5:

The rejection of claim 1 is incorporated, and Dahlstedt further teaches the step of performing said detecting and reporting steps responsive to allocating one of said resources in said resource pool (dahlstedt, FIG. 4, [0022], "for each object object, in step 94, the object header includes a time stamp field which is initially set as T_{init}, i.e., the time at which the object is initialized. In step 96, as the object is used, or referenced by a subsequent object, the time stamp filed is updated with the last access time T_{access} for this particular object).

Per Claim 6:

The rejection of claim 1 is incorporated, and Dahlstedt further teaches the step of performing said detecting and reporting steps responsive to an elapsing interval (FIG. 4, [0022], "The system is then allowed to run for check time T_{check}, in step 98. This process is repeated in step 100 for each object in memory. In step 102, the system receives a request, i.e., either an automatic request or a determined request by the operator, to view the object display or object map. In step 104, the time stamp is checked for each object in the memory... If $T_{check} - T_{access}$ is greater than a specified time T_{limit}, the object may be considered cold...all object in memory will now be indicated as being warm or cold. In step 110, all cold objects that point to another are clustered together...These are of particular importance to the software developer since thy represent large potential memory leaks").

Per Claim 7:

Dahlstedt teaches A memory leak detection and reporting system ([0007]) comprising: a resource pool comprising a plurality of allocable resources ([0008], "a memory space for storing objects"); a pool manager programmed to manage allocation of said allocable resources to calling code segments ([0009], "creating objects in memory of a run-time environment; stamping each object with a time stamp when created; updating the time stamp as each object is accessed or referenced"); and, a data store of allocated resources (Dahlstedt, FIG. 4, [0022]); Dahlstedt does not explicitly teach corresponding identities for calling code segments receiving said allocated resources. However, Tarditi teaches

corresponding identities for calling code segments receiving said allocated resources (Tarditi, col. 10,

lines 18-28).

It would have been obvious to one having ordinary skill in the computer art at the time of the

invention was made to modify the method disclosed by Dahlstedt to include corresponding identities for

calling code segments receiving said allocated resources using the teaching of Tarditi. The modification

would be obvious because one of ordinary skill in the art would be motivated to facilitate automated

memory management among heterogeneous components of a computer program (Tarditi, col. 4, lines

40-42).

Per Claim 8:

Dahlstedt teaches pool manager (Dahlstedt, [0009]); Dahlstedt does not explicitly teach a

communicative coupling to a call stack; and, correlation logic for correlating a calling code segment

reference disposed in said call stack to a concurrently allocated one of said allocable resources.

However, Tarditi teaches a communicative coupling to a call stack (Tarditi, FIG. 3, col. 9, lines 62-67, col.

10, lines 1-10); and, correlation logic for correlating a calling code segment reference disposed in said call

stack to a concurrently allocated one of said allocable resources (Tarditi, FIG. 3, col. 10, lines 11-28).

Per Claim 9:

The rejection of claim 7 is incorporated, and Dahlstedt further teaches a garbage collector

coupled to said resource pool 110 (Dahlstedt, [0007], "The invention provides a system and method for

detecting memory leaks in a garbage collected environment").

Per Claim 10:

Dahlstedt teaches A memory leak detection and reporting method (Dahlstedt, [0007]) comprising

the steps of: allocating a resource from a resource pool, time stamping said allocated resource and

recording an identity for a calling code segment acquiring said allocated resource (Dahlstedt, FIG. 4,

[0022], "the object header includes a time stamp field which is initially set as T_{init}"); updating said time

stamp when said allocated resource is accessed (Dahlstedt, [0022], "...as the object is used, or

referenced by a subsequent object, the time stamp field is updated with the last access time T_{access} for this

particular object"); inspecting said time stamp to determine if said allocated resource has become overly

idle (Dahlstedt, FIG. 4, [0022], "The system is then allowed to run for a check time T_{check}, in step 98");

and, if it is determined that said allocated resource has become overly idle, reporting a suspected

memory leak in association with said allocated resource (Dahlstedt, FIG. 4, [0022], "This process is

repeated in step 100 for each object in memory. In step 102, the system receives a request, i.e., either an

automatic request or a determined request by the operator, to view the object display or object map. In

step 104, the time stamp is checked for each object in the memory... If $T_{check} - T_{access}$ is greater than a

specified time T_{limit}, the object may be considered cold...all object in memory will now be indicated as

being warm or cold. In step 110, all cold objects that point to another are clustered together...These are

of particular importance to the software developer since thy represent large potential memory leaks");

Dahlstedt does not explicitly teach further reporting said recorded identity for said calling code segment

which had acquired said allocated resource. However, Tarditi teaches further reporting said recorded

identity for said calling code segment which had acquired said allocated resource (Tarditi, col. 13, lines

16-25).

It would have been obvious to one having ordinary skill in the computer art at the time of the

invention was made to modify the method disclosed by Dahlstedt to include further reporting said

recorded identity for said calling code segment which had acquired said allocated resource using the

teaching of Tarditi. The modification would be obvious because one of ordinary skill in the art would be

motivated to facilitate automated memory management among heterogeneous components of a

computer program (Tarditi, col. 4, lines 40-42).

Per Claim 11:

Dahlstedt teaches A memory leak detection and reporting method (Dahlstedt, [0007]); Dahlstedt

does not explicitly teach the step of performing said inspecting and reporting steps in a separate thread of

execution. However, Tarditi teaches the step of performing said inspecting and reporting steps in a

separate thread of execution (Tarditi, col. 11, lines 3-5).

Per Claim 12:

The rejection of claim 10 is incorporated, and Dahlstedt further teaches the steps of performing

said allocating, inspecting and reporting steps in a pool manager (Dahlstedt, [007]-[0008]).

Per Claim 13:

The rejection of claim 10 is incorporated, and Dahlstedt further teaches the step of performing

said inspecting and reporting steps responsive to allocating another resource in said resource pool

(Dahlstedt, [0007]-[0008]).

Per Claim 14:

The rejection of claim 10 is incorporated, and Dahlstedt further teaches the step of performing

said inspecting and reporting steps responsive to an elapsing interval (Dahlstedt, FIG. 3, [0021], lines 13-

29).

Per Claims 15-17, and 19:

These claims are the machine readable storage version of the claimed method discussed above

(claims 1-3, and 6), wherein all claim limitations also have been addressed and/or covered in cited areas

as set forth above. Thus, accordingly these claims are also obvious.

Per Claim 20:

This claim is the machine readable storage version of the claimed method discussed above

(claim 10), wherein all claim limitations also have been addressed and/or covered in cited areas as set

forth above. Thus, accordingly this claim is also obvious.

7.   Claims 4 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dahlstedt et al.

US 2004/0133895 A1 (hereinafter Dahlstedt), in view of Tarditi US 6,625,808 B1 (hereinafter Tarditi), and

further in view of Fu US 2004/0172579 A1 (hereinafter Fu).

Per Claim 4:

        The rejection of claim 2 is incorporated, and further, the combination of Dahlstedt and Tarditi

does not explicitly teach the steps of: for calling code segment in which a resource is allocated, inducing a

placebo error condition in close proximity to code for allocating said resource; and, reading error data

from said calling stack produced by said placebo error condition, said error data comprising identity

information for said calling code segment. However, Fu teaches teach the steps of: for calling code

segment in which a resource is allocated, inducing a placebo error condition in close proximity to code for

allocating said resource (Fu, FIG. 5, step 600, FIG. 6, step 699, [0042], lines 17-25, and [0045]); and,

reading error data from said calling stack produced by said placebo error condition, said error data

comprising identity information for said calling code segment (Fu, [0044]).

        It would have been obvious to one having ordinary skill in the computer art at the time of the

invention was made to modify the method disclosed by the combination of Dahlstedt and Tarditi to include

the steps of: for calling code segment in which a resource is allocated, inducing a placebo error condition

in close proximity to code for allocating said resource; and, reading error data from said calling stack

produced by said placebo error condition, said error data comprising identity information for said calling

code segment using the teaching of Fu. The modification would be obvious because one of ordinary skill

in the art would be motivated to detecting memory leaks in computing environments that does not require

examining all aspects of a computer's memory (Fu, [0003], lines 22-24).

Per Claim 18:

        This claim is the machine readable storage version of the claimed method discussed above

(claim 4), wherein all claim limitations also have been addressed and/or covered in cited areas as set

forth above. Thus, accordingly this claim is also obvious.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Deng whose telephone number is 571-272-5989. The examiner can normally be reached on Monday to Friday 9:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached at 571 –272-3708. The fax phone number for the organization where this application or proceeding is assigned is 703-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anna Deng

March 2, 2007

WEI ZHEN
SUPERVISORY PATENT EXAMINER